

1

3,261,689

SOLUBLE COFFEE PROCESS

George B. Ponzone, Nutley, N.J., assignor to General Foods Corporation, White Plains, N.Y., a corporation of Delaware

No Drawing. Filed June 7, 1963, Ser. No. 286,206
3 Claims. (Cl. 99-71)

This application is a continuation-in-part of Serial No. 128,979, filed August 3, 1961, now abandoned.

This invention relates to a soluble coffee product of improved aroma and flavor and, more particularly, to a process for producing such a coffee product.

Many attempts have been made to enhance the cup aroma and flavor of instant coffee products. Essentially these attempts have been directed to the isolation of some essential oil or other aromatic constituent from roasted and ground coffee. A very significant commercial improvement has been achieved by such attempts. However, many consumers of roasted and ground coffee still prefer this type of brew because of its robust cup aroma and flavor.

It has also been attempted to introduce a small fraction of ground roasted coffee into the dried soluble coffee product. However, such a product has become rancid very quickly thus releasing undesirable flavors on reconstitution while leaving an unsightly coffee sediment. Attempts to introduce the ground roasted coffee directly into the soluble coffee extract have not been viewed with favor due to the belief that the roasted coffee would lose its aromatic notes by solubilization while leaving only an undesirable dearomatized residue of coffee solids, such solids contributing only rancid flavor notes on reconstitution.

It would, therefore, be desirable if a method were devised for introducing ground roasted coffee into soluble coffee extract to thereby enhance the flavor of the soluble coffee while at the same time avoiding rancidity problems.

This invention is founded on the discovery that a stable soluble coffee product of improved flavor containing roasted and ground coffee therein, may be produced by a process which comprises preparing an aqueous extract of soluble coffee solids; tempering a charge of roasted coffee beans for at least three hours at a temperature of -80° to 10° F. to thereby congeal the coffee oils in said beans and develop large crystals of water ice; subdividing the cooled beans at a temperature of below -80° F. into fines of particulate powder wherein substantially all of the coffee fines pass through a 100 mesh U.S. Standard Sieve Screen and at least 50% pass through a 200 mesh U.S. Standard Sieve Screen; preventing oxidation of the coffee oils in the fines before adding the fines to the coffee extract; adding the charge of coffee fines to the extract while dispersing the fines to wet each particle of coffee as it enters the body of extract to thereby avoid clumping of fines in said extract, the extract being at a temperature of 40° to 100° F. and the charge of coffee fines being added at a level of 1-10% by weight of the soluble coffee solids in the extract; maintaining the extract at 40° to 100° F. while solubilizing 1-10% of the coffee solids in the fines and continuing to disperse the fines throughout the body of coffee extract; and spray drying the extract at an inlet air temperature of 300° - 450° F. and an outlet air temperature of 150° - 250° F., the fines being encapsulated with a thin coating of soluble coffee extract to thereby stabilize the coffee fines.

Unexpectedly, it has been found that the product of this invention enjoys a stability not found in soluble coffee products produced by a mere blending of roasted and ground coffee with the dried extract for "instant" coffee. Thus, the fixation of the particulate coffee particles in the powder produced upon spray drying, does not undergo rancidity or loss of freshness, which a product would normally be expected to encounter due to the presence of

2

roasted and ground coffee therein. One of the reasons for this appears to be the encapsulating soluble coffee coating which is formed on the roasted and ground coffee particle during spray drying. By virtue of such a coating the roasted and ground coffee mixed with the soluble coffee will retain its freshness for substantially the same length of time as the soluble coffee extract. Advantageously, the brew prepared from the soluble coffee product of this invention provides a most desirable robust cup coffee flavor and aroma as well as an aroma in the container in which it is packed.

The invention, according to its more specific aspects, involves slowly cooling or tempering roasted coffee beans to thereby freeze or congeal the coffee oils in the beans. This is accomplished by a gradual reduction in the temperature of the beans over a period of at least 3 hours, say 6-12 hours, preferably in a freezing room having an ambient temperature of -50° F. After the beans have been tempered and cooled to below 10° F., preferably to -50° F., they are subjected to a hammer-milling or other impact-type milling operation whereby the roasted coffee particles are subdivided to a very fine degree. Normally, the oleaginous components of the coffee will be liberated as a result of such fine particulation and, accordingly, it is for this reason that the beans are first tempered and then ground at temperatures below -80° F., preferably -110° F. by co-grinding in Dry Ice. Any heat given off during grinding will be taken up by the Dry Ice and the oils solidified in the tempering step will be liquefied only to a slight extent. In any event, the various aromatic and flavor retaining oils will not be liberated to atmosphere but will solidify or remain solidified within the discrete coffee particles. After this controlled temper and grinding operation is performed, the coffee fines must be protected from atmospheric oxidation of the released coffee oils. This may be done by blanketing the coffee fines with an inert gas such as carbon dioxide, nitrogen, argon, or helium. Alternatively, the coffee fines may be stabilized by keeping the product temperature of the fines below 10° F.

It is a feature of the present invention that the soluble coffee extract containing about 20-30% soluble coffee solids is cooled to a temperature below 100° F., typically in the neighborhood of 50° - 70° F. in a hold-up tank preparatory to spray drying. The aqueous coffee extract is preferably cooled to this low temperature in order to properly continue the pretreatment or conditioning of the roasted and ground coffee particles as the particles are introduced thereto in a manner wherein each particle of roasted coffee is wetted with extract. Care should be taken in the addition of the fine particles of roasted coffee to prevent clumping of the particles. This is preferably accomplished by adding the fines through a vibrating screen having a mesh size of 100 mesh U.S. Standard Sieve and agitating the extract throughout the addition stage. The hold-up tank containing the extract should be subjected to a pressurized atmosphere of inert gas (say 5-10 p.s.i.g.) during this operation to prevent foaming of the extract and degradation or oxidation of the coffee oils in the fines.

The particles of ground roasted coffee should not remain in this blend tank for more than one hour, preferably not more than 3-10 minutes. The charge of coffee fines which is usually 3-6% by weight of the soluble coffee solids in said extract is uniformly dispersed in the extract and is partially brewed and solubilized, the solubilization of coffee solids being kept below 10%. By appropriate tempering of the coffee fines preparatory to their introduction to the coffee extract and the low temperature mixing with the extract, the coffee oils which are present in the coffee fines do not introduce an undesirable "oil slick" or surface emulsion in the hold-up tank and the particles themselves are most effectively dispersed in the body of extract without clumping together. In this way the required